

Lunar Materials Handling System, Phase I

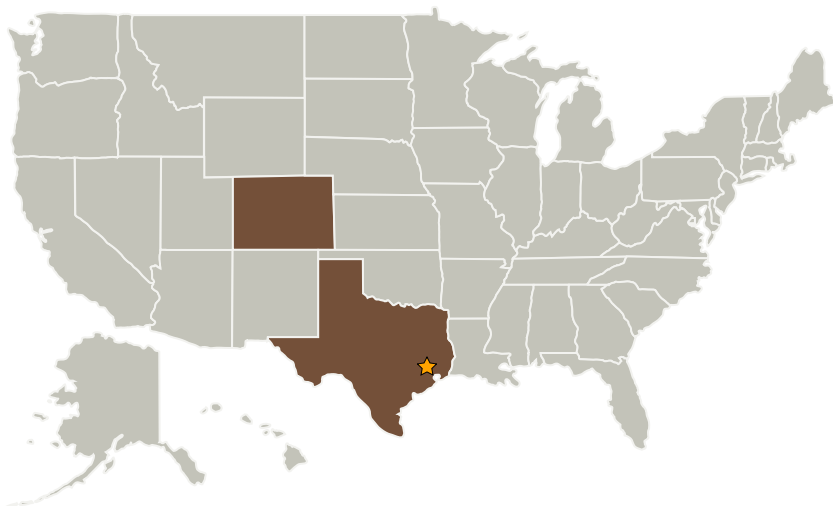
Completed Technology Project (2006 - 2006)



Project Introduction

The Lunar Materials Handling System (LMHS) is a method for transfer of bulk materials and products into and out of process equipment in support of lunar and Mars in situ resource utilization (ISRU). The LMHS conveys solids to the ISRU vessel, provides a gas-tight pressure/vacuum seal, and minimizes wear related to abrasive particles. Lunar and Mars ISRU scenarios require that equipment be operated over many cycles with minimal consumption of expendables and with minimal leakage in order to maintain high overall process leverage. ISRU processes can be demonstrated in the laboratory to establish basic feasibility with respect to reagent leverage. Reagent leverage is defined as the mass of commodity produced divided by the mass of reagents consumed. However, the process leverage component related to equipment wear and loss of gasses, reagents, or product through seals and valves is more difficult to establish from laboratory testing. The LMHS increases equipment life and minimizes process losses, thereby increasing overall leverage and reducing uncertainties in ISRU process evaluation. The LMHS is based on a seal arrangement by which lunar regolith can be introduced into and removed from reaction chambers operating under a wide range of batch operating conditions.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Pioneer Astronautics	Supporting Organization	Industry Historically Underutilized Business Zones (HUBZones)	Lakewood, Colorado

Primary U.S. Work Locations

Colorado	Texas
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX07 Exploration Destination Systems
 - └ TX07.1 In-Situ Resource Utilization
 - └ TX07.1.2 Resource Acquisition, Isolation, and Preparation